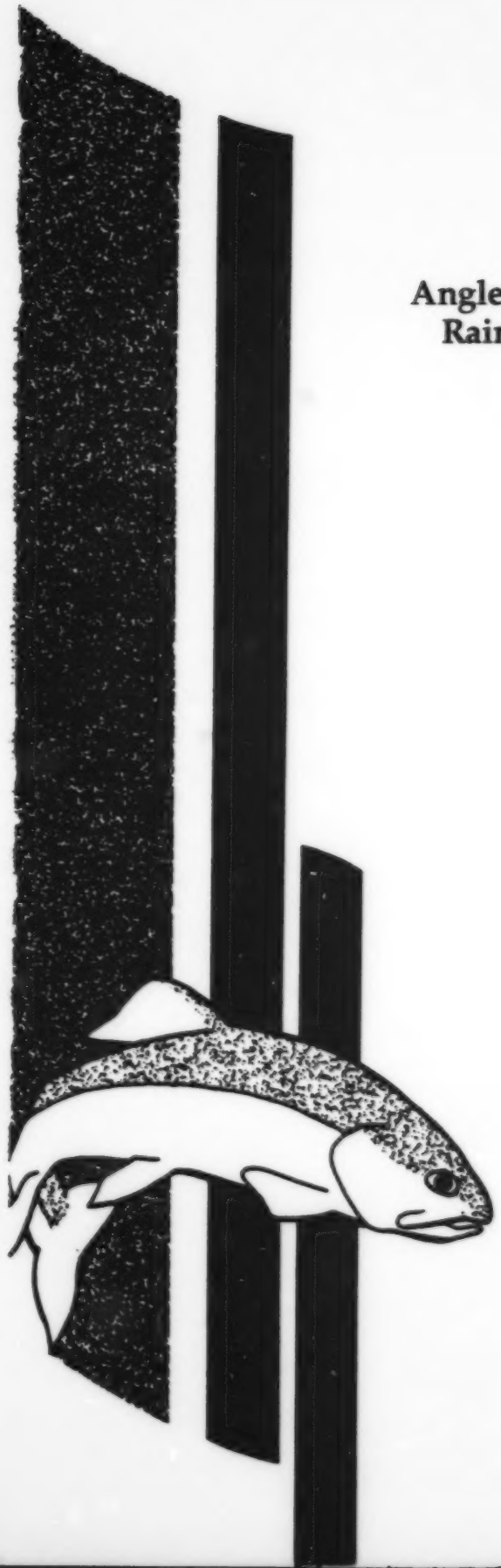

Angler Harvest of Lake Char, Kokanee and Rainbow Trout from Bridge Lake, 1990.

by

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Abstract

Lirette, M.G. 1991. Angler harvest of lake char, kokanee and rainbow trout from Bridge Lake, 1990. B.C. Ministry of Environment, Fisheries Technical Circular No. 92, 19p.

Between May and September, 1990, the recreational sport fishery on Bridge Lake was surveyed. Aerial boat counts were used to estimate angler use at 10,133 angler days. Effort in the 1990 fishery increased 30% over previous years. A total of 699 anglers were interviewed throughout the summer at a fishing resort and a provincial campground adjacent to the lake. The average number of anglers per boat was 1.86 and the average angler hours per angler was 4.0. Anglers spent an estimated 40,533 hours fishing to catch 4,965 lake char (0.12/hour), 4 154 kokanee (0.1/hour) and 1 216 rainbow trout (0.03/hour). Ninety-six percent of the sport fish caught by anglers were killed. The estimated total harvest for lake char was 5 000 kg or 3.6 kg per hectare of lake surface area. This was three to six times higher than the theoretical sustainable harvest for this species. Lake char in the creel and on the spawning beds averaged 45.8 and 45.3 cm fork length, respectively. Spawning lake char first mature at 7 years of age. They averaged 14 years old based on otolith samples and 9 years old based on scale samples. Ages have yet to be verified. Total lake char yield indicates overexploitation while age and growth data suggests a slow growing stunted population of lake char which has not been heavily impacted. A reduction in the regulated daily catch is recommended to offset increasing angling pressure on Bridge Lake. A total of eleven different food items were identified in 36 stomach samples of char from Bridge Lake. Zooplankton and aquatic insects each occurred in 60% of the fish while only 8% of the lake char had eaten fish. The catch of kokanee and rainbow trout represented 5.0 and 0.9% of the fish stocked, respectively, into Bridge Lake. Management recommendations are discussed.

Acknowledgements

Mr. John Bianchi of Nature Hills Resort and creel surveyor Alan Spencer were instrumental in gathering creel data from Bridge Lake anglers. Fish culture staff headed by Tony Massy and Grant Gale captured and sampled lake char spawners. Shayne MacLellan and Ken Kroeker provided otolith aging. Dennis Wilders provided assistance in lake char sampling and analysis. Eric Parkinson and Jack Leggett reviewed and commented on an early draft of this report. Rebecca Fairburn and Barb Matthews typed the manuscript.

INTRODUCTION

Two of the key problems in managing lake char (Salvelinus namaycush) are their susceptibility to over-harvest and low sustainable yields. Lake char waters are generally unproductive (Fry 1939) and the sustainable yield is usually 0.25 to 0.75 kg/ha/yr (Olver et al. 1991; Martin and Olver 1980; Healey 1978). Lake char are susceptible to over-harvest at least partly because they mature at older ages and larger sizes than most freshwater salmonids. Proposed strategies for dealing with these problems are outlined in the Ministry of Environment lake trout management strategy for northern British Columbia (deLeeuw et al. 1991).

The fishery in Bridge Lake produces an unusually high yield of small lake char. The small size of the char and the popularity of the sport fishery suggested that this population may be on the verge of over-exploitation. The main objective of this study was to determine the status of the lake char population by quantifying angler harvest and analyzing age, growth and diet of the fish. An additional objective was to evaluate the effectiveness of kokanee (Oncorhynchus nerka) and rainbow trout (O. mykiss) stocking programs in Bridge Lake.

STUDY AREA

Bridge Lake is located approximately 45 km southeast of 100 Mile House, British Columbia (Fig. 1). The lake supports a significant sport fishery with over 8,000 angler days in 1989 (revised from Tredger 1990). The fishery is directed at a wild stock of lake char, rainbow trout augmented by stocking and stocked kokanee salmon. The lake char in Bridge Lake are near the southern extreme of their natural distribution in British Columbia (Carl et al. 1959).

Bridge Lake was surveyed by the B.C. Game Department in 1952 (B.C. Environment, Williams Lake, B.C. unpubl.). The lake has a surface area of 1,375 hectares and a maximum and mean depth of 46.9 m and 17.3 m, respectively. The total dissolved solids are 134 mg/l. A gill net set on September 8, 1952, captured burbot (Lota lota), lake char, large scale sucker (Catostomus macrocheilus), squawfish (Ptychocheilus oregonensis) and peamouth chub (Mylocheilus caurinus). The presence of rainbow trout was confirmed by angling on September 10, 1952.

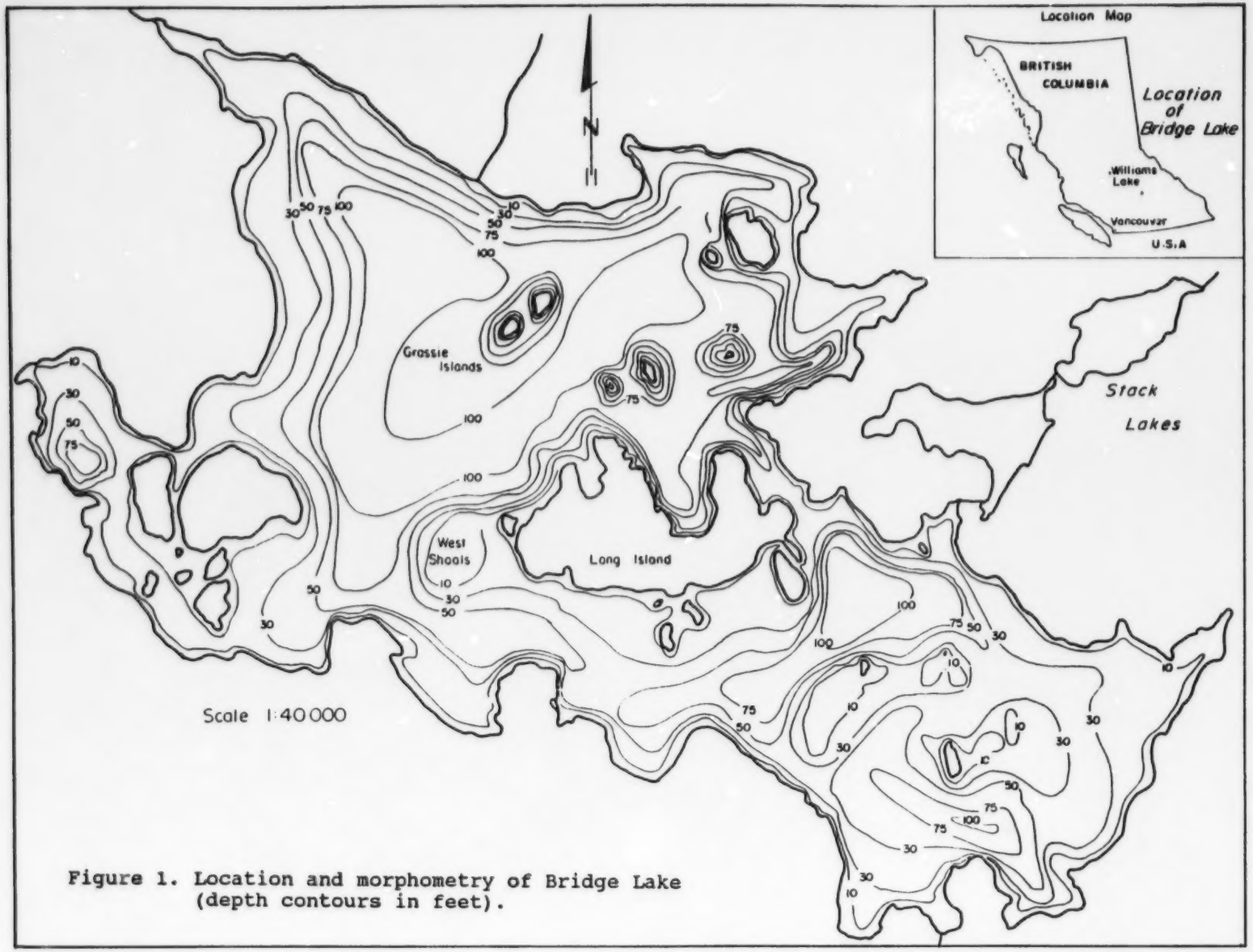

Figure 1. Location and morphometry of Bridge Lake (depth contours in feet).

METHODS

An estimate of total angler use on Bridge Lake for the summer fishery in 1990 was derived from aerial boat counts as described by Tredger (1990). Boats fishing on Bridge Lake were counted at approximately 11:00 am on twenty weekend days throughout the summer.

Total angler effort for the 1990 summer fishery on Bridge Lake was calculated using a relationship between average midday weekend boat count and total angler days adapted from Bull and Houston (1985 MS) and revised by Tredger (1991 in prep.).

A) Total Boat Hours = 1 267 * Mean Boat Count

B) Total Angler Hours = Total Boat Hours * Number of Anglers per Boat

C) Total Angler Days = Total Angler Hours / Hours per Angler Day

The 1990 boat counts were compared to counts made in 1987, 1988 and 1989 (B.C. Environment, Williams Lake, B.C. unpubl.) by comparing the natural log estimate of the mean boat counts.

$$\text{D) adjusted mean count} = \left(\left(\sum_{1}^{N} \frac{}{\text{count} + 0.5} \right)_{N} \right)^{2} - 0.5$$

Nature Hills Resort, under contract to the B. C. Ministry of Environment, collected angler data on effort and catch success on the same day as aerial boat count days. Catch per unit effort, determined as total catch/total hours fished, was applied to the total estimated effort derived from boat counts to generate an estimate of total catch by species in the sport fishery.

Lake char killed by anglers were measured for length, scale sampled and when available stomachs were taken and frozen for diet analysis.

During late October 1989 and 1990, in cooperation with Ministry of Environment, Fish Culture staff, spawning lake char were captured by angling and gillnetting. Fish were sampled for sex, length and analyzed for disease pathogens (Massy 1989). Ages were determined by two independent otolith readings in 1989 and by independent otolith and scale readings in 1990.

RESULTS

Aerial Boat Counts

Effort was spread relatively evenly through the May to September period (Table 1). The estimated total effort for the summer fishery was 21 792 boat hours, 40 533 angler hours and 10 133 angler days. Effort in 1990 was 30.1% higher than the average of the last 3 years (Table 2) but this increase was not significant (p=.14).

Table 1. The number of boats fishing Bridge Lake on weekend days, May to September, 1990.

Date	Number	Date	Number
May 6	0	June 23	26
May 12	1	June 30	27
May 19	27	July 8	25
May 20	27	July 21	7
May 26	5	Aug 5	30
June 2	15	Aug 11	8
June 3	3	Aug 18	7
June 9	17	Aug 26	18
June 16	24	Sept 2	35
June 17	30	Sept 15	11
Mean Count = 17.2		Estimated Angler Days = 10 133	

Table 2. The natural log conversion of the mean number of boats fishing Bridge Lake, May to Sept., 1987 to 1990.

Year	Adjusted Mean Boat Count	Percent Change
1987	12.4	
1988	10.2	-18
1989	12.2	+20
1990	15.1	+24

Creel Survey

Between May and September, 1990, 375 interviews were made to determine the effort and catch success of 699 anglers (Table 3). There were an estimated 1.86 anglers per boat who fished 4.0 hours per day. The 699 anglers spent 2,796 hours fishing to catch 340 lake char, 290 kokanee and 81 rainbow for an overall catch success of 1.02 sportfish per angler day. The average daily catch per angler was 0.49 lake char, 0.41 kokanee and 0.12 rainbow trout.

The catch success peaked for char during August (0.78 fish/day), in June for kokanee (0.66 fish/day) and in September for rainbow trout (0.21 fish/day).

Table 3. Summary of creel survey data for Bridge Lake, May to September, 1990.

Parameters	May	June	July	Aug	Sept	Total
Number of Interviews	20	107	102	94	52	375
Number of Anglers	44	207	195	168	85	699
Anglers per party	2.20	1.93	1.91	1.79	1.63	1.86
Number of angler hrs	129	792	785	726	364	2796
Hours per angler day	2.93	3.83	4.03	4.32	4.28	4.00
Lake Char Caught	20	94	57	131	38	340
Lake Char/Angler Hour	0.16	0.12	0.07	0.18	0.10	0.12
Lake Char/Angler Day	0.45	0.45	0.29	0.78	0.45	0.49
Kokanee Caught	6	136	106	23	19	290
Kokanee/Angler Hour	0.05	0.17	0.14	0.03	0.05	0.10
Kokanee/Angler Day	0.14	0.66	0.54	0.14	0.22	0.41
Rainbow Caught	2	17	24	20	18	81
Rainbow/Angler Hour	0.02	0.02	0.03	0.03	0.05	0.03
Rainbow/Angler Day	0.05	0.08	0.12	0.12	0.21	0.12
Combined Fish Catch	28	247	187	174	75	711
Combined Catch/Hour	0.22	0.31	0.24	0.24	0.21	0.25
Combined Catch/Day	0.64	1.19	0.96	1.04	0.88	1.02

Catch quotas are typically inspected on a boat party basis, therefore individual angler catch was derived by averaging the number of anglers and their combined catch. Over half of all angling trips produced a catch of 0 char (Table 4). At Bridge Lake 10.5% of the anglers, who caught more than one lake char per day, caught 49.8% of the total harvest.

Table 4. The number of anglers, averaged by boat party, who killed one to five lake char and the number of char in excess of 2 fish per angler day for Bridge Lake, May to September, 1990.

Number of Lake Char Harvested/angler day	Number of Anglers(%)	Number of Lake Char in excess of 2 per angler day (%)
Greater than 5	0 (0)	0 (0)
Greater than 4	4 (0.6)	12 (3.5)
Greater than 3	7 (1.0)	23 (6.7)
Greater than 2	32 (4.6)	97 (28.6)
Greater than 1	73 (10.5)	169 (49.8)
Greater than 0	282 (40.3)	340 (100.0)
Zero	417 (59.7)	N/A

Estimated Total Catch

An estimate of total angler catch and harvest of sport fish in Bridge Lake for the summer fishery was based on expanding catch per angler day, from the creel sample, to the total effort of 10,133 days, derived from aerial boat counts. A total of 4,965 (4,864 killed) lake char, 4,154 (4,053 killed) kokanee and 1 216 (1,013 killed) rainbow were captured in the 1990 fishery (Table 5).

Table 5. The estimated total catch and harvest of sport fish from Bridge Lake, May to September, 1990.

Species	Number per angler day		Estimated total for the fishery of 10 133 days	
	caught	killed	caught	killed
Lake char	0.49	0.48	4 965	4 864
Kokanee	0.41	0.40	4 154	4 053
Rainbow	0.12	0.10	1 216	1 013
Combined	1.02	0.98	10 336	9 930

Lake Char Size

A total of 65 lake char captured by anglers were sampled for length and scales while 34 were sampled for stomach diet studies. Lake char captured by anglers averaged 45.8 cm in fork length (range 36 to 55 cm). The length frequency distribution indicates that 75% of char captured by anglers ranged over a very narrow 7.5 cm range, 42.5 to 50.0 cm (Fig. 2). The average size of spawning lake char, captured by angling over spawning shoals in Bridge Lake during October 1989 and 1990 was similar to the creeled fish at 45.3 cm fork length (range 38 to 52 cm, n=79).

Lake Char Age

In 1989, 40 otolith from spawning lake char were aged independently by staff at the Pacific Biological Station, Nanaimo B.C. and North/South consultants, Winnipeg, Manitoba. In 1990, 21 otolith were aged at the Biological Station and corresponding scales were independently read by B.C. Environment staff in Williams Lake (Table 6). The average age of spawning char determined by otolith reading was 14.6 and 13.6 years for 1989 and 1990, respectively. The average age from scale reading of the 1990 spawner sample was 9.4 years. The 1990 age distribution varied considerably between otolith readings (5 to 26 years) and scale readings (8 to 12 years). Age at first maturity was estimated at 7 years old.

The 1989 and 1990 age frequency distribution of spawning lake char, based on otolith readings, ranged from 5 to 28 years old. The majority were between 8 and 16 years of age (Fig. 3). The length at age data (Fig. 4) indicates rapid growth until age 7 (maturity) followed by extremely slow growth over the next 20 years. The annual growth rate is approximately 3 mm per year between the age of 5 and 25 years.

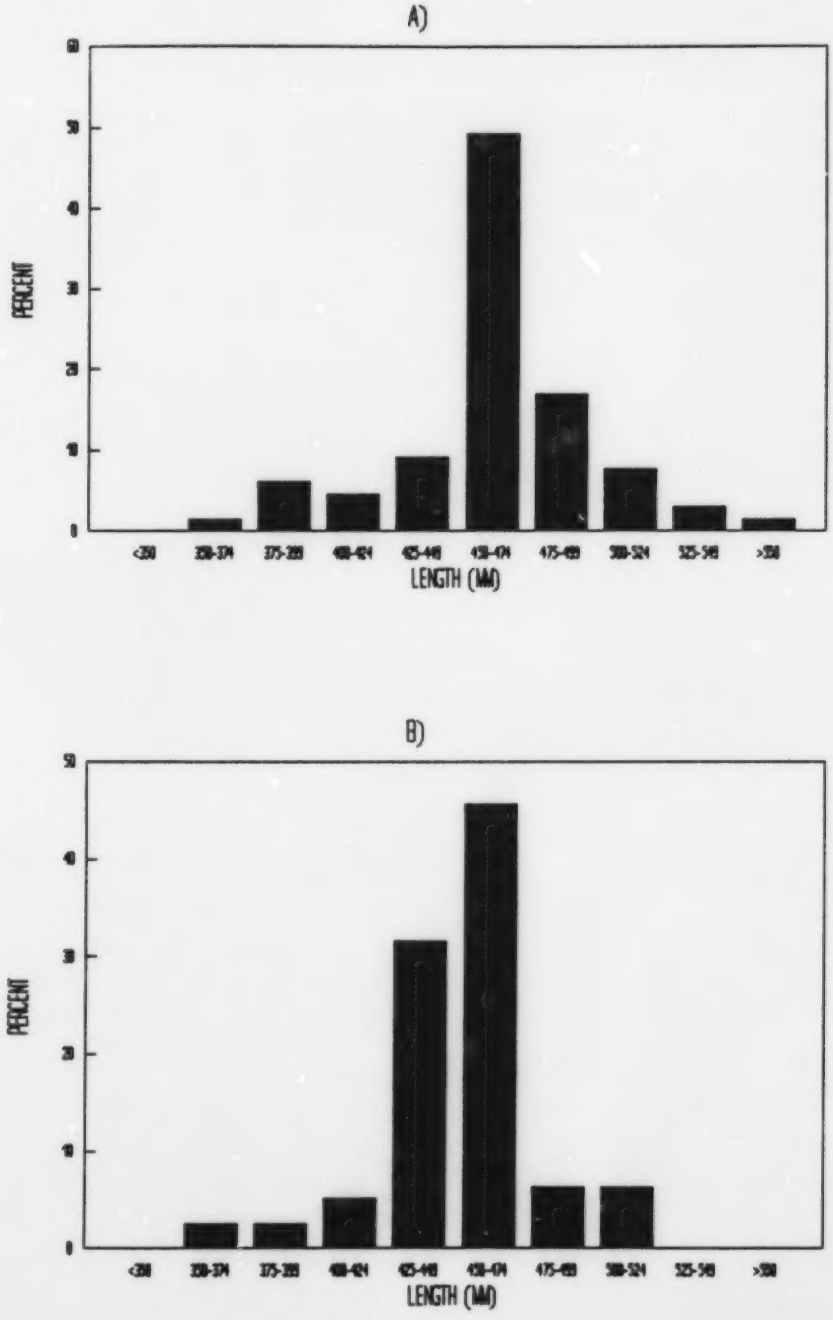

Fig. 2. Length frequency distribution of lake char from Bridge Lake, A) 1990 angler creel (n=65) and B) 1989 and 1990 spawners (n=79

Table 6. The number of Bridge Lake char at various ages determined independently from otolith and scale readings for fish caught at spawning, October 1989 and 1990.

	1989			1990	
Age	Otolith[1]	Otolith[2]	Mean[3]	Otolith[1]	Scales
5	2			1	
6				1	
7	2		2	3	
8	5		5	1	3
9	2	6	2	3	10
10	3	3	2		6
11		1	3		1
12		4	1	1	1
13	5	1	2	2	
14	3	6	4	1	
15	3	2	4		
16		3	1	1	
17	1	4	3		
18	2	1		1	
19	1	2	2	2	
20	1		3	1	
21	3	1	2		
22	1	1			
23	1	1	1		
24		1	1	1	
25	1	2	1	1	
26	2			1	
27	1		1		
28					
29	1				
	14.9	14.9	14.6	13.6	9.4

1. S. Maclellan, Pacific Biological Station, Nanaimo, British Columbia.

2. K. Kroeker, North/South Consultant, Winnipeg, Manitoba.

3. Mean age of individual fish based on the two otolith readings.

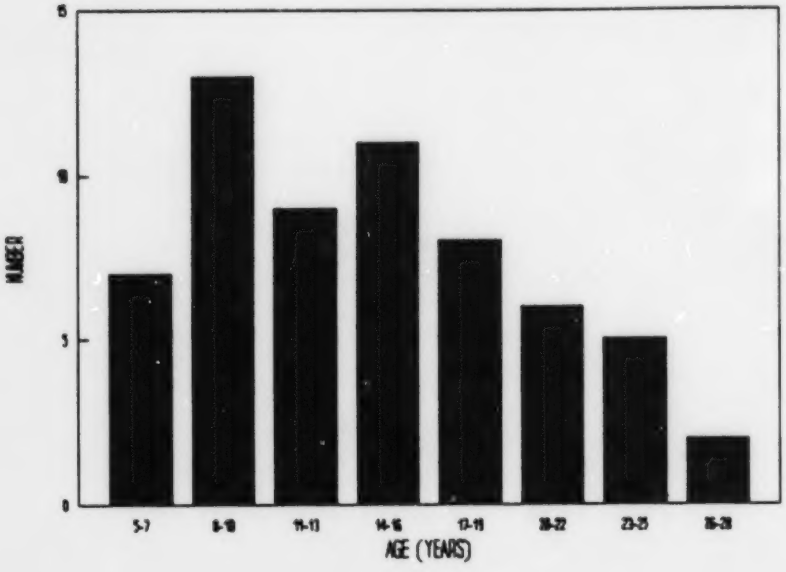

Fig. 3. Age frequency distribution of spawning lake char from Bridge Lake, October 1989 and 1990.

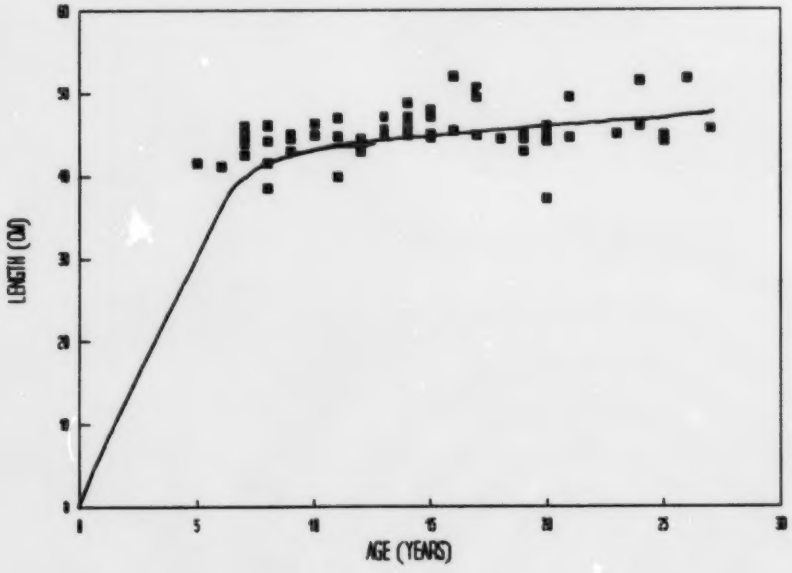

Fig. 4. Age at length data for spawning lake char from Bridge Lake, October 1989 and 1990 (growth curve fitted by eye).

Lake Char Diet

A total of eleven food types were identified in the 38 stomach samples recovered from Bridge Lake char (Table 7). All of the food items sampled are common or occasionally found in lake trout diets (Martin and Olver 1980). The most frequent foods identified in the May/June samples were choronomids (58%), amphipods (37%) and daphnia (26%). In July/August samples daphnia (59%) and choronomids (59%) were most common. Fish were identified in 16% of the May/June samples and were not found in the July/August char. The May/June fish had a greater variety of food items (10 vs 5) than the later sample and included more shallow water invertebrates. The July/August samples had twice as many fish with empty stomachs and half the volume of food in their gut compared to the spring sample. The seasonal change in number, type and amount of food items is not uncommon for lake char (Martin and Olver 1980). It is related to the availability of food as the char migrate to deeper cooler waters during July and August (Rawson 1961).

Table 7. Frequencies of occurrence for prey types in the stomachs of lake char captured by anglers from Bridge Lake, spring and summer, 1990.

Food Type	May and June Number[1] (% occurrence)	July and August Number[2] (% occurrence)
Cladocera (daphnia)	5 (26)	10 (59)
Diptera (midges)	11 (58)	10 (59)
Ephemeroptera (mayflies)	3 (16)	0
Trichopera (caddisflies)	3 (16)	0
Odonata (dragon & damsel flies)	5 (26)	0
Hemiptera (beetles)	3 (16)	0
Amphipoda (scuds)	7 (37)	0
Hirudinea (leechs)	4 (21)	1 (6)
Gustropoda (snails)	2 (11)	1 (6)
Pelecypoda (clams)	0	1 (6)
Pisces (fish)	3 (16)	0
Empty	3 (16)	6 (35)
Mean stomach volume (ml)	3.4	1.7

1 sample size = 19
2 sample size = 17

DISCUSSION

Lake Char

The number of lake char harvested from Bridge Lake in the 1990 summer fishery is equivalent to approximately 5 000 kg (mean size of 45 cm and 1 kg.). Relative to the lake's surface area of 1 375 hectares the annual harvest is estimated at 3.6 kg per hectare of lake area. This is approximately six times the recommended sustainable harvest rate of 0.5 kg/hectare proposed by Healey (1978) and three times the harvest rate of 1 kg/hectare found by Martin and Olver (1980) in their review of lake char production. The maximum potential harvest of lake char from Bridge Lake is estimated at between 724 kg and 1 273 kg per year. This is equivalent to 0.53 and 0.93 kg/hectare and is based on yield equations derived from Ontario Lakes (Evans et al. 1991; Olver et al. 1991; Payne et al. 1990). This would suggest the implementation of an immediate reduction in angler harvest. The catch estimate, however, is based on a regression for mean weekend boat count and total boat hours. This has a coefficient of variance equal to 25% (Tredger in prep.). The actual harvest rate may fall somewhere between 2.7 and 4.5 kg per hectare. The harvest estimate based on boat counts and creel samples may be inaccurate. An intensive survey of the fishery may be required to correctly estimate the total char harvest from Bridge Lake.

The age frequency distribution (mean age of 14 years) and the length at age data indicates that the char population has not been adversely impacted by fishing mortality. The rate of growth, high for immature fish and extremely slow for mature fish, may reflect the lake productivity. There is an abundance of insect forage for juvenile fish and a lack of suitable forage fish for mature lake char. The juvenile char growth rate has yet to be documented in Bridge Lake but it appears to be on the high side of the growth curve model presented by Power (1978). It is not as high, however, as the growth rates for declining populations of char from the Great Lakes (Healey 1978). The growth rate of mature char from Bridge Lake is extremely slow and falls within the low side of growth models presented by Power (1978) and Kerr (1971). Compared to other lake char populations in British Columbia, Bridge Lake has the slowest growth rate (deLeeuw 1991). Slow growth of older lake char is associated with the lack of an appropriately sized forage base (Kerr 1971). Annual growth rate of 3mm is similar to the growth rate of char from Opeongo Lake, Ontario prior to the introduction of cisco as a forage fish (Matuszek et al. 1990). The introduction of kokanee into Bridge Lake may improve the growth rate of older lake char. In 1990, fish did not substantially contribute to lake char diet.

The age and growth analysis relies on the validity of the ageing techniques used. The discrepancies of ageing lake char by otolith and scales has been reviewed by Healey (1978) and Martin and Olver (1980). Recent analysis of calcified structures and body length relationships in fish indicates that in older char, growth of scales virtually ceases while body growth continues (Casselman 1990). It has been suggested by Sharp and Bernard (1988) that otolith and opercular bones are best used for age validation while scales may be suitable for aging immature lake char. In any event verification of the aging technique is required (Beamish and MaFarlane 1983). To replace lost production from fish culture sampling a one time stocking of lake char into Bridge Lake occurred in 1990. These marked fish of known age will provide valuable age verification in the future. Precise char ageing, however, may not be critical for Bridge Lake since the key point is that the older fish are growing very slowly and that the harvest is concentrated on fish of spawning age. Over time these fish are not going to substantially increase in size.

Angling effort is the primary determinant of lake char harvest (Carl et al. 1990; Goddard et al. 1987) and over-harvest by anglers is the most critical stress affecting lake char populations (Evans et al. 1991; Olver 1988). It is recommended that for stock conservation the harvest of lake char in Bridge Lake should not be allowed to increase as the angler effort increases for kokanee. Anglers catch lake char incidently on the same terminal gear used for kokanee, particularly during the spring. The present regulations on Bridge Lake (1990/1992) allows for the harvest of 6 trout and char combined of which one can be over 50 cm in length. If no rainbow trout are kept each angler can harvest six char per day (1 over 50 cm) and have 12 in possession (2 over 50 cm). Relative to the average harvest of 0.49 lake char per angler day the present regulations are not effective in controlling harvest. Individually anglers have difficulty appreciating the significance of their small catch relative to the total harvest in the fishery (Christie 1978).

Based on catches pooled by boat party, reducing daily catch limits for lake char from 6 to 3 would affect 1% of the angling parties but would only reduce the harvest by 7%. A reduction from 6 to 2 char per day would affect 5% of the anglers and reduce the kill of lake char by close to 30% or down to 2.5 kg/hectare. Based on the present size distribution a minimum size limit would not be required to protect immature fish but could be used to reduce the harvest further. A minimum size limit of 40 cm would reduce the creel by about 8% or 388 fish. These are proactive recommendations to safeguard the lake char resource in Bridge Lake. In the long term, should the fishery on the lake continue to increase, further reductions in catch and/or size limits may be required.

Kokanee

The estimated 4,154 kokanee caught by anglers in the 1990 fishery is equal to 4.97 % of the 83 620 fry (0.7g) stocked into Bridge Lake on April 1, 1988 (Table 8). If kokanee harvested at 1+ and 3+ are included, the overall survival to the angler creel may approach 6%. This estimate is similar to that found at Odell Lake, Oregon were 7.0% of stocked kokanee were creeled (Lewis 1975). In September and October 1989 and 1990 an estimated 4,500 kokanee spawners were observed in tributary creeks of Bridge Lake (5.4 % fry survival). The overall survival of 10 to 11 % combined creel and spawner survival is near the upper range of the 2 to 11% survival rate found for lakes stocked with kokanee in B.C., Idaho, Colorado and Oregon. (Thorp 1989,1988; Parkinson 1986; Cochnauer 1984; Fleck 1980 MS; Klein 1979; Lewis 1975).

The stocking density of kokanee into Bridge Lake for 1988 was 61 fry/hectare. In other stocked lakes in the Cariboo the density ranges from 43 fish/hectare in Horse Lake to 220 fish/hectare in McLeese Lake. Since fish densities can affect kokanee and sockeye growth rates (Rieman and Bowler 1980; Rogers 1980) the ultimate size of an adult kokanee will vary with stocking density. Based on small sample sizes adult kokanee in Bridge Lake averaged 42cm fork length (39 to 47cm) while those in McLeese Lake were approximately 31cm in length (28 to 34cm) (Ministry of Environment, Williams Lake, B.C. unpubl. data). Future kokanee stocking in Bridge Lake will have to be adjusted as natural recruitment begins to supply juveniles to the lake.

Table 8. The date, number, size and species of fish stocked into Bridge Lake, 1980 to 1990.

Date	Species	Number	Size(g)	Life stage
October 1980	rainbow	100 000	1.3	fry
September 1981	rainbow	100 000	2.1	fry
June 1982	rainbow	101 710	3.9	yearlings
September 1982	rainbow	100 100	1.3	fry
May 1983	rainbow	100 000	3.4	yearlings
September 1984	rainbow	100 000	0.8	fry
September 1985	rainbow	125 000	0.8	fry
Aug./Oct. 1986	rainbow	175 000	0.6	fry
July 1987	rainbow	100 000	4.2	yearlings
Sept./Oct 1987	rainbow	125 000	1.1	fry
April 1988	kokanee	83 620	0.7	fry
May/June 1988	rainbow	95 000	8.3	yearlings
May 1989	kokanee	100 000	1.0	fry
June 1989	rainbow	85 000	6.5	yearlings
April 1990	kokanee	75 000	0.5	fry
May 1990	rainbow	65 000	7.0	yearlings
September 1990	lake char	13 027	6.9	fry

Rainbow Trout

Between 1986 and 1988 approximately 130,000 yearling and/or yearling equivalent rainbow trout fry were stocked annually into Bridge Lake. The resulting catch of 1,216 rainbow trout in the 1990 fishery equals about 0.9 % survival to the creel. This is likely an overestimate since an unknown portion of the catch may be the result of natural recruitment. These are extremely poor results when compared to the 48% survival to the creel (Stringer et al. 1980) and the 46% survival to age 2+ (Johnston et al. 1991) for yearling trout stocked into small monoculture lakes of B.C. It is similar, however, to the 0.5% survival of fall fry stocked into Puntzi Lake B.C. (Westover 1987) and the 4.8% survival of fry stocked into Dillon reservoir, Colorado (Stuber et al. 1985). Both Bridge and Puntzi lakes have large populations of competing course fish including squawfish. Interspecific competition can have dramatic impacts on the survival and growth of sport fish (Magnan 1989) and predaceous squawfish feed on juvenile salmonids (Poe et al. 1991). Stocking programs of rainbow trout into these complex ecosystems have not been very successful in British Columbia. The development of new rainbow trout broodstocks better able to compete with coarse fish is being persuaded by the Ministry of Environment (Tsumura and Godin 1991; Blann et al. 1990). The stocking strategy for rainbow trout in Bridge Lake should be reviewed.

MANAGEMENT RECOMMENDATIONS

1) Reduce the total harvest of lake char from Bridge Lake by reducing daily bag limits and/or implementation of a minimum size limit.

2) Monitor changes in total angler effort on Bridge Lake through aerial boat counts.

3) Verify lake char age by sampling known age fish marked and released into Bridge Lake in 1990 and sample juvenile char of ages one to five.

4) Monitor the mean age and length at age of lake char spawners.

5) Monitor changes to kokanee size frequency distribution and adjust stocking accordingly.

6) Review the rainbow trout stocking program for Bridge Lake.

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